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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/848,771	05/03/2001	Toshiaki Ito	033808/0278757	6625

7590

08/28/2003

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EXAMINER

FORMAN, BETTY J

ART UNIT

PAPER NUMBER

1634

DATE MAILED: 08/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/848,771	ITO ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	BJ Forman	1634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 21 July 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 4,5,8 and 9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 4,5,8 and 9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                    | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                           | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>05/03</u> | 6) <input type="checkbox"/> Other: _____                                    |

**DETAILED ACTION**

***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 21 July 2003 has been entered.

2. This action is in response to papers filed 21 July 2003 in which claims 4 and 5 were amended, claims 6 and 7 were canceled and claim 9 was added. All of the amendments have been thoroughly reviewed and entered. The previous objections and rejections in the Office Action dated 28 March 2003 are withdrawn in view of the amendments. All of the arguments have been thoroughly reviewed but are deemed moot in view of the amendments, withdrawn rejections and new grounds for rejection. New grounds for rejection are discussed.

Claims 4-5 and 8-9 are under prosecution.

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***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 9 is indefinite in line 3 for the recitation "the tip of the supply passage" because the recitation lacks proper antecedent basis in the claim. It is suggested that Claim 9 be amended to provide proper antecedent basis e.g. replace "the" with "a".

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 4, 5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Balch (U.S. Patent No. 6,083,763, filed 31 December 1997) in view of Italiano (U.S. Patent No. 4,380,772, issued 19 April 1983), Yurion et al (EP 0 947819 A2, published 6.10.1999) and Zeheb et al (U.S. Patent No. 5,552,087, issued 3 September 1996).

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Regarding Claim 4, Balch teach a method for producing at least one biochip comprising putting a solution containing a biopolymer into an inject device and ejecting the solution from the ink jet device to a substrate to immobilize the biopolymer on a spot of a substrate of the biochip (Column 11, lines 33-65). Balch teaches the method utilizes known ink jet devices and technologies (Column 11, lines 40-54) but Balch does not specifically teach that two solutions of different gravity are placed into the ink jet device. However, ink jets comprising two solutions of differing gravity were well known in the art at the time the claimed invention was made as taught by Italiano. Italiano teaches that ink devices are supplied with two solutions wherein the second solution has a gravity smaller than the first solution and the two solutions are not mixed whereby all of the first solution is depleted (Column 3, lines 40-44) and wherein depletion of the first solution from the ink jet is identified by the presence and/or detection of the second solution (Column 2, lines 21-52). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the two solutions of Italiano to the ink jet deposition of Balch and to supply the ink jet with two solutions of differing gravity whereby depletion of the first (i.e. biopolymer) solution complete and is identified by the presence of the second solution as taught by Italiano (Column 2, lines 32-52). One of ordinary skill in the art would have been motivated to completely deplete the biopolymer solutions of Balch to thereby maximize biopolymer solutions by depositing all of the solution within the ink jet device and to thereby minimize the amount and cost of reagents required as desired by Balch (Column 11, lines 33-36).

Balch teaches the first solution contains a biopolymer and a buffer (Column 31, lines 42-44) but they do not teach the buffer is Tris-HCl. However, biochips prepared by depositing biopolymer solutions containing Tris-HCl buffers were well known in the art at the time the claimed invention was made as taught by Yurino et al (¶ 35-36). As such, the buffer of Balch and the buffer of Yurion et al used to buffer biopolymer solutions for biochip preparation are deemed functional equivalents. The courts have stated with regard to homologs that the

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greater the physical and chemical similarities between the claimed species and any species disclosed in the prior art, the greater the expectation that the claimed subject matter will function in an equivalent manner (see *Dillon*, 99 F.2d at 696, 16 USPQ2d at 1904). Therefore, one of ordinary skill in the art would have been motivated to replace the buffer of Balch with that of Yurion et al based on the fact that the practitioner would have expected the Tris-HCl buffer to function in an equivalent manner.

Italiano teaches their solution having a smaller gravity (i.e. indicating fluid) forms a floating layer on top of the first solution (Column 2, lines 24-31 and Column 3, lines 40-42) and they further claim the solution is a liquid placed on the surface of the first solution (Claim 1) which suggests that their claimed liquid encompassed any liquid having the smaller gravity which functions as a floating layer but they do not specifically teach mineral oil or liquid paraffin. However, it was well known in the art at the time the claimed invention was made that mineral oil and liquid paraffin form a floating layer over aqueous solutions as taught by Zeheb et al (Column 1, lines 53-60 and Column 2, lines 6-19). Zeheb et al further teach that the mineral oil or liquid paraffin prevent evaporation of biopolymer containing solutions (Column 2, lines 33-37). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the mineral oil or liquid paraffin of Zeheb et al to the floating layer of Italiano for the expected benefit of preventing evaporation of the biopolymer containing solution in the ink jet device as suggested by Zeheb et al (Column 2, lines 6-12).

Regarding Claim 5, Balch teaches the method wherein the ejecting steps include repeatedly replacing a biochip under the head of the inkjet device and ejecting the solution onto another biochip to thereby produce a plurality of biochips (Column 11, line 66-Column 12, line 12).

Regarding Claim 8, Balch teaches the method wherein the ink jet device comprises biopolymers and the method utilizes known ink jet devices and technologies (Column 11, lines 40-54) but Balch does not specifically teach that two solutions of different gravity are placed

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sequentially into the ink jet device. However, ink jets comprising two solutions of differing gravity sequentially added to the ink jets were well known in the art at the time the claimed invention was made as taught by Italiano. Italiano teaches that ink devices are supplied with a first solution and then a second solution wherein the second solution has a gravity smaller than the first solution and wherein the solutions are added sequentially so as to not mix the two solutions (Column 2, lines 26-30). Italiano teaches that the two solution ink jet device provides for depletion of the first solution (Column 3, lines 40-44) and identification of the first solution depletion by the presence and/or detection of the second solution (Column 2, lines 21-52). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the two solutions of Italiano to the ink jet deposition of Balch and to supply the ink jet with two solutions of differing gravity whereby depletion of the first (i.e. biopolymer) solution complete and is identified by the presence of the second solution as taught by Italiano (Column 2, lines 32-52). One of ordinary skill in the art would have been motivated to completely deplete the biopolymer solutions of Balch to thereby maximize biopolymer solutions by depositing all of the solution within the ink jet device and to thereby minimize the amount and cost of reagents required as desired by Balch (Column 11, lines 33-36).

### **Conclusion**

7. Claim 9 is free of the prior art of record and may be placed in condition for allowance following resolution of the above rejections.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BJ Forman whose telephone number is (703) 306-5878. The examiner can normally be reached on 6:30 TO 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on (703) 308-1119. The fax phone numbers for the organization where this

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application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 308-8724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0196.



BJ Forman, Ph.D.  
Primary Examiner  
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August 27, 2003